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The Multi-Dimensional and Reconfigurable Organization

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One of the new organizational forms that will evolve in the 21st century is the multi-dimensional organization. In the 1950s and 1960s, some pioneering technology companies moved to a two-dimensional matrix design in order to rapidly bring new technologies to market. Since then, companies have added new dimensions of geography, market segments, channels, and solutions to their structures. These dimensions are not just add-ons. They are interdependent and must be interwoven with the existing dimensions. The organizational innovation in these designs is in the creation of new coordination mechanisms like management processes, reward systems, and career paths. The other feature that is being developed in today's multi-dimensional multinational firms is the ability to self-reconfigure. In order to avoid commoditization, many companies are moving away from selling stand-alone products. Instead, they provide integrated packages of products, services, software, and, most of all, thought leadership. Companies like IBM, Cisco Systems Inc., and other infrastructure providers are creating customized solutions for their customers. They assemble and disassemble teams of hundreds of people from across the company who move from opportunity to opportunity. Their reconfigurable organizations consist of a stable part and a variable part. The stable structure is usually the functional and/or geographical home for nurturing talent. The reconfigurable part is the talent that is selectively moved into cross-company teams serving an ever-changing portfolio of opportunities. This type of company will organize around any dimension that represents an opportunity and for which the company has the expertise to create value for the customer.

In this paper, I first describe the reasons why some companies are being driven to adopt more complex (multi-dimensional) organizational designs. Then I examine Procter & Gamble Co.'s Four Pillars design and illustrate how it is able to accommodate huge global customers such as Wal-Mart Stores. Following that, I describe in detail the multi-dimensional and reconfigurable design of IBM. Finally, I discuss the theoretical and managerial implications of managing complexity.

DRIVERS OF COMPLEXITY

Managers usually dislike complexity. They far prefer to "keep it simple." So why, in a number of large companies, are they adopting more and more complexity in their organizational designs? There are several reasons driving them. First, there is the pressure for growth and the well-known law of requisite variety. Publicly traded companies need growth to increase their stock price and to maintain an above-average price to earnings ratio, and growth by itself is needed to attract talent. In order to grow, companies diversify into adjacent businesses and expand across borders into other country markets. The law of requisite variety states that as the environment becomes more complex, the organization must also become more complex and create new units to manage various environmental segments that are relevant for their goals. The sales and marketing functions are good examples. As the mass market has segmented, these functions have created new units for market segments and for different types of media and multiple distribution channels to reach those segments. Second is the shift of competition to the provision of customized solutions and away from stand-alone products. The move to solutions by large U.S. and European companies allows them to compete by avoiding commoditization of their products and by drawing upon their accumulated intellectual capital. For customers, solutions represent a form of miniature outsourcing, and they welcome the ability to let others create value for them. Third is the focus on growth in emerging markets and sustainable infrastructure. For example, Saudi Arabia and China are creating whole new cities from scratch. But in many of these countries the government is a major player in the economy. There are state-owned enterprises that are simultaneously customers, partners, and potential suppliers. The result has been the re-emergence of the country manager in global companies. They represent the voice of the government in the multinational matrix designs.

The growth of customized solutions and emerging markets present large companies with an ever-changing array of opportunities. The reconfigurable organization allows firms to reorganize around

opportunities. The size of these problems is driving the return of “Big Science,” which is tailor-made for big companies that can organize around opportunities.

MULTI-DIMENSIONAL STRUCTURES

As growth slowed in their home markets, many companies chose to expand into markets in other countries. The initial organizational response of companies from large countries was to add separate international divisions. However, when sales from outside the home country reached about 30–40% of total sales, the international division was broken up. If the company was a consumer goods company, like Procter & Gamble, the international division was replaced by a regional structure, with the U.S. as one of the regions. If the company was a business-to-business enterprise, then it evolved to worldwide business units. The international division was divided up among the business units. In both cases, the companies retained the other dimension, businesses or countries, as an overlay or matrix on their dominant profit center structure.

The Four-Dimensional Structure

In the 1990s and more recently, firms have encountered their customers in multiple countries and in multiple businesses. Many of these customers have indicated a preference to be served through a single unit in the vendor organization. Some of these vendors have created global account units to serve their customers. Other customers have desired closer relationships with their suppliers and prefer to buy solutions and even outsource certain activities to them. Suppliers such as IBM, Accenture, and Procter & Gamble have formed multi-functional, multi-business, multi-country customer-facing units. Their organizations have been divided into two parts, a front end, which is customer-focused, and a back-end, which is business-focused. This front-back model allows these companies to achieve global scale with their businesses and local adaptation and customization for their customers.

An example of this structure is Procter & Gamble’s Four Pillars Structure. Prior to the Four Pillars design, P&G and other multinational consumer products companies such as Nestlé operated a three-dimensional matrix with functions, business units, and geographic markets. The new four-dimensional structure is exemplified in Fig. 1.

The left side of the chart is familiar. It shows the global functions that make up pillar one and the global business units (GBUs) that constitute pillar two. If these two pillars were the entire structure, we would recognize the organization as a two-dimensional matrix, but P&G has pulled apart the value chain. The upstream or back-end of the value chain is organized by

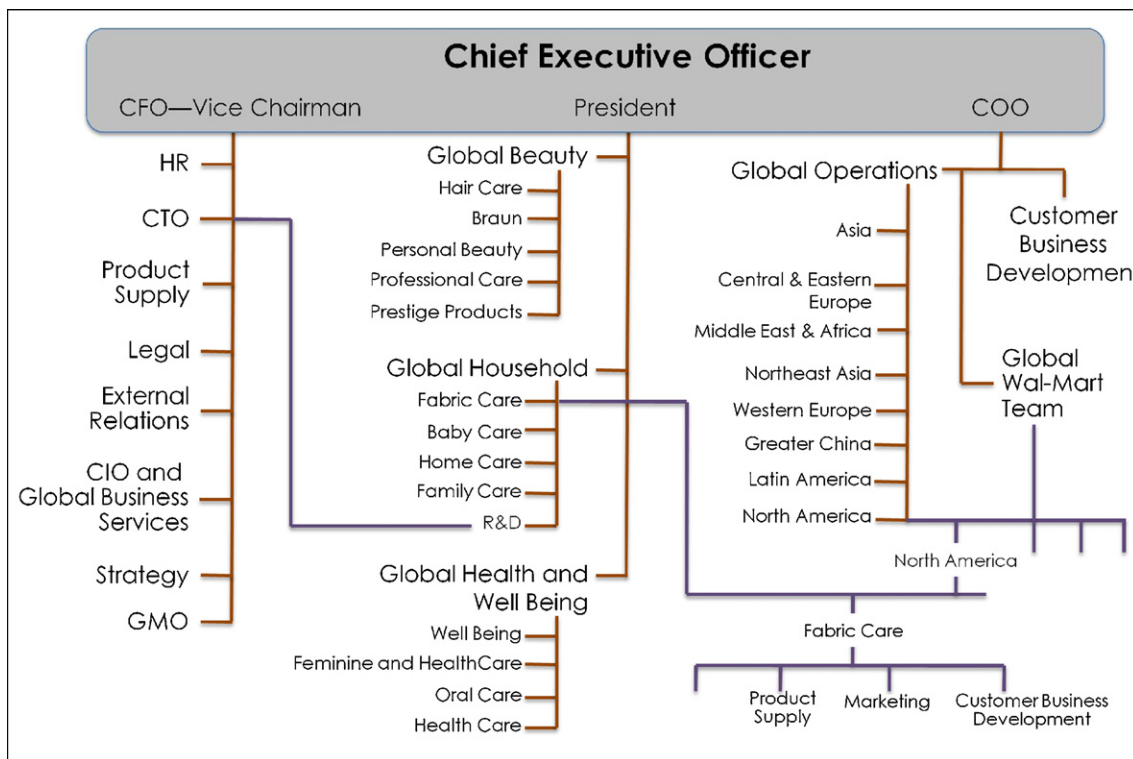
product lines or brands (such as Tide) that are gathered into global business units (such as Fabric Care) and global business groups (such as Global Household). The business units consist of the product development, product supply (supply chain), and product marketing functions. They also have the usual corporate functions of finance, human resources, and IT as well as a sales liaison group. The downstream, or front end, of the value chain is organized by customers. The third or regional pillar serves local customers. The fourth or global customer pillar serves global customers like Wal-Mart. This structure arises because customers can buy products from all global business units, and many customers want a single interface at P&G to support their central buying. The regional and customer teams are comprised of the product supply function (from factory to retailer), the regional and customer marketing function, and the sales function (P&G calls it Customer Business Development).

The front end of the organization – regions and customers – reports into the chief operating officer (COO). The back-end – the GBUs – reports into the president. The head of research and development (R&D) for the Global Household Group works for both the Group Head and the chief technology officer (CTO) as shown in Fig. 1. Indeed, members of all the global functions working in the businesses report to both their functional heads and their business heads, as they have for the last 35 years.

The global functions, which form the corporate center in Cincinnati, report into the vice-chairman and chief financial officer (CFO), and to the CEO. The top four executives form a top executive team. The P&G structure thus shows another feature of these multi-dimensional structures. The organization’s complexity exceeds the capability of a single CEO to run it. So very often there are offices of two, three or more executives to manage the entire enterprise.

The global Wal-Mart team matrix is illustrative of how the complexity is managed. Recall that Wal-Mart accounts for something like one-third of P&G’s revenues. A global team of about 250 people manages that revenue. The head of the Wal-Mart team reports to the COO. The team organization is based on global functions (not shown in Fig. 1 chart) and regions where Wal-Mart has retail operations. The largest operation is in North America, and it is shown reporting into the team leader. The North American head also reports to the North American regional head. The North American Wal-Mart team is organized around the business units whose products they sell to Wal-Mart. The Fabric Care business unit is shown on the chart. A sales manager specializing in Fabric Care brands like Tide and Dash manages it. The sales manager reports to the head of the North American Wal-Mart team and to a North American head in the Fabric Care GBU. So the Wal-Mart team is a mirror image of the P&G structure of functions, regions, and

FIGURE 1 PROCTER & GAMBLE'S FOUR-DIMENSIONAL MATRIX



business units. At each level, the Wal-Mart team reports to the next manager in the team and to a unit manager in P&G. To complete the team structure, there are functions that report into the Fabric Care sales manager. They also report into their respective functional head in the Wal-Mart team. In this manner, the customer dimension is well integrated into the other three dimensions of the P&G structure.

Integration of the Multi-Dimensional Structure

The integration of the four dimensions is facilitated by the company-wide career system. If you ask someone from P&G about his or her reporting relationship, the answer is, "I report to my functional boss and to my line boss." So people enter P&G by joining a function but then move from business unit to region to customer team and back again. The leaders develop an understanding of the company and all its dimensions, and how they work together. Second, they develop networks across the company to facilitate lateral coordination at the interfaces. This process continues at the top levels. For example, the head of the Baby Care business

unit moved to become the Asia Region head. If successful there, she could return and run a bigger business unit and then go back to run a larger region. A third facilitator of multi-dimensional integration is P&G's long history of working in cross-unit teams. Starting with high-performance work teams in the factories in the 1960s, P&G extended the team concept to cross-functional business teams in the 1980s. They became global business unit teams in the 1990s, when the cross-functional teams also worked across regions. In the 1980s, P&G started creating customer teams in the United States. Starting with Wal-Mart, these teams were cross-business and cross-function. More recently, the customer teams were extended to become cross-business unit, cross-region as well as cross-function. The teams have been introduced for ten global retailers. In this way, P&G has created a capability of integrating multiple dimensions. The final integrating mechanism is the planning and budgeting process.

ORGANIZATIONAL INFRASTRUCTURE

It is the organizational infrastructure that makes the multi-dimensional structure work. Successful

multinational firms have created common business processes and defined roles and responsibilities. They have adopted common new product development processes, supply chain processes, pricing processes, and so on. When implementing these processes, they define who does what by using decision rights tools or responsibility charts. The management processes for allocating resources, measuring performance, and selecting and developing managers are crucial to the design.

Management Processes

Management processes allocate scarce resources, such as money and talent, in an organization. These processes usually result in targets and commitments from the leaders of the different dimensions. The planning and budgeting process is usually the primary management process. If all four dimensions at P&G followed their own plans, there would be chaos. However, each dimension prepares a plan for the coming year, as well as the next three years, and then this is followed by a reconciliation process to see that goals are aligned. The challenge is to execute the reconciliation in a timely and nonbureaucratic fashion.

Most multi-dimensional companies execute something like the process used by P&G. P&G starts its process in the regions after receiving corporate strategy guidelines. The North American region prepares plans both by customer and by business. The spreadsheet shown in Fig. 2 demonstrates how the results are displayed and reconciled. When such a reconciliation process is insufficient, many companies resort to large meetings of managers and customers. In these meetings, the customer and business team members gather in a room for extended periods to work through their issues. Specialists run these meetings. One group runs something called a Decision Accelerator, which is a fast-track form of large-scale meeting that is particularly useful in the case of contentious issues. The specially trained facilitators are very skilled at getting groups of 20 or more people to come to an agreement. The reconciliation results in the plan and budget for North America and the regional component of the businesses.

There are usually some issues to reconcile at the corporate level as well, and the Decision Accelerator is sometimes used for this purpose. So through processes such as these, companies are implementing multi-dimensional organizations, but with an aligned set of goals and an integrated enterprise plan.

To be sure, multi-dimensional companies are still struggling with the reconciliation process in an effort to make it inclusive, timely, and aligned. Many are streamlining their process and adopting mechanisms like the Decision Accelerator. The multi-dimensional

companies' management processes will continually evolve and be a source of organizational innovation.

Performance Management

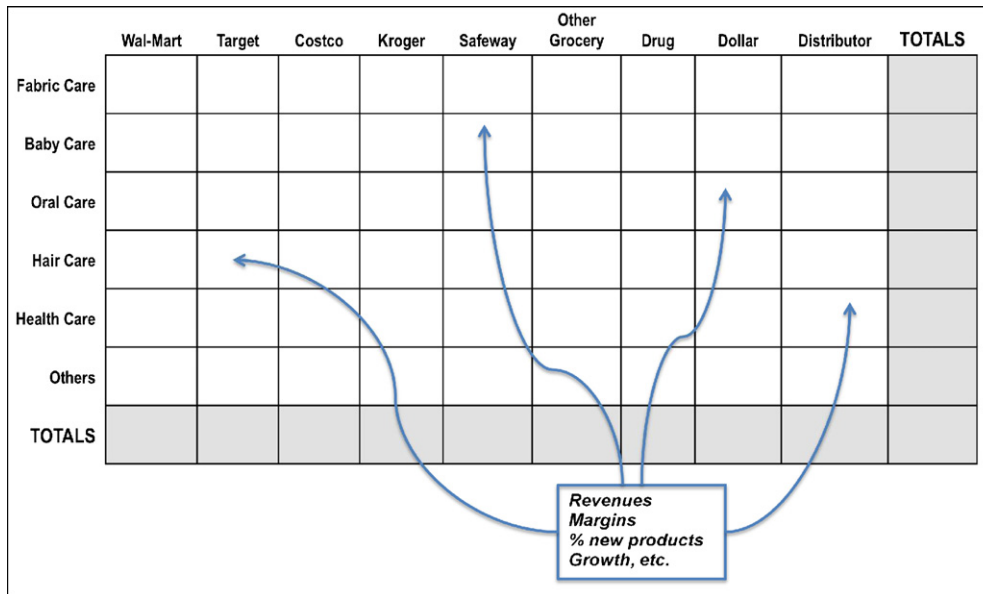
Companies organized multi-dimensionally assess and reward performance in new ways. They still want their leaders to deliver their numbers and meet their commitments, but in addition, they need leaders who contribute to the reconciliation process and work well with their peers. As a result, the performance management process is being redesigned to produce a full and fair assessment of their leaders' performance. By "full" they mean assessments of whether the goals were met, whether the manager lived the values of the company, whether the leaders collaborated in the reconciliation process, and so on. The trend is toward valid, subjective performance assessments.

It takes a lot of hard work to produce valid subjective performance assessments. The professional services firms like McKinsey & Co., The Goldman Sachs Group, and Latham & Watkins do the best job. They free up a partner who takes a week or more of his or her time to produce an assessment. The partner interviews the person being assessed, as well as that person's clients, peers, and others who have worked on projects led by that person. The partner reads the exit interviews of former associates who worked for the person being assessed. The assessment considers revenue generated, whether relationships were built with clients, if the person contributed to the intellectual property of the firm, whether the person contributed to recruiting and developing talent, and so on. It is a thorough assessment and is facilitated by people taking the process seriously. Peers take the time and give thoughtful views of the person in question. They are asked to give actual examples of behaviors and avoid off-hand remarks.

The assessments are fair and equitable because they are standardized across the company, and then thoroughly debated. Each evaluator has a list of tested and standardized questions to use. The results are then vetted and discussed in performance committees across the regions and at the firm level. Although overall results are reported while preserving individual privacy, the process is made to be as transparent as possible. It is very easy for partners in other countries to perceive that the home-country partners get more than their fair share, and transparency is the best remedy for this problem.

Few companies go to the lengths of the professional services firms, but most of them are moving toward more valid subjective performance assessments. Multi-dimensional organizations run on collaboration and contributions to the enterprise above making your own numbers. So full and fair performance assessments are being developed and deployed across these companies.

FIGURE 2 PROCTER & GAMBLE'S REGIONAL SPREADSHEET



Selection and Development

The behaviors of managers must be collaborative, and a subjective assessment process is needed to reward and develop such behavior. Companies can also increase their chances of uncovering collaborative behaviors if they bring in people who are more naturally collaborative in the first place. As a result, we are seeing greater efforts at recruiting, developing, and promoting people with these kinds of knowledge and skill sets. Companies search for people who fit in with the ways of working in the multi-dimensional firm. Like the subjective assessment, these efforts require more time and effort. The mantra today is “hire hard, manage easy.” The companies invest in processes to get the right players on the field. The people development process follows many of the usual practices, including rotational assignments. From this, people learn how to manage with authority in line jobs and without authority in corporate staff roles. They learn about the various regions of the world where the company operates. These people stay a long time with their organizations and develop company-specific skills. Most important, they learn how to navigate in these multi-dimensional structures. The three- and four-dimensional structures are evolving due to pressures to grow and adapt to environmental complexity. These multi-dimensional structures are

interdependent, as new dimensions are integrated into existing structures. Such organizations are managed through multi-level matrix designs and with infrastructures that use redesigned processes for resource allocation, performance management, and talent selection and development.

THE RECONFIGURABLE MULTI-DIMENSIONAL ORGANIZATION

The reconfigurable organization consists of both stable portions and dynamic portions, and it configures and reconfigures itself around opportunities. There are two main stable parts of the organization. The first stable part is the basic structure, and the second stable part is the set of common business processes. As people move from one team assignment to another, the processes are common and stay the same. The financial systems, the new product development process, the customer relationship process, the performance management process, and so on are the same everywhere. Certainly, there are process “owners” who constantly try to improve them, but business processes are stable and common throughout the organization.

The variable parts of the organization are the teams that form and reform, and the management decision-making groups that allocate resources and determine priorities. Teams are formed by gathering people from

functional areas across the company. For example, teams design and launch a new product or solution, generate a customer proposal, enter a new country, build a new distribution channel, improve a business process, implement a solution, and so forth. Such teams are continuously reconfigured to address the set of opportunities facing the company.

Teams also prepare business plans for their product line, customer segment, and country. These plans are channeled into the planning and budgeting process to be reconciled and to produce an aligned set of goals for all the dimensions. But usually the process is not straightforward, and difficult choices need to be made so the Decision Accelerator and other managerial tools are used.

IBM's Multi-dimensional and Reconfigurable Organization

IBM began assembling teams when it chose to focus on solutions, services, and software in the late 1990s. Louis Gerstner, the CEO at the time, chose to listen to his customers rather than his investment bankers. The customers' advice was not only to keep IBM's businesses together but also to integrate them more tightly in order to get all the hardware and software to work together. The customers wanted integrated and customized solutions. Gerstner obliged and reorganized IBM into a front-back structure very much like P&G. There was a customer-facing front end that was organized by region and customers, which were segmented by industry groups. The back-end was organized into business units that were collected into groups for hardware, software, and services. The usual corporate functional groups were matrixed across both the front and back structures. IBM's organization structure is shown in Fig. 3.

IBM's organization later evolved into a five- then six-dimensional matrix design. The fifth dimension was generic solutions like Enterprise Resource Planning (ERP) solutions, e-commerce solutions, and so on. These generic solutions consisted of all products and were used across all customer segments. The solutions units were part of the Global Services organization. Then the front end added a channels structure shown as "Partners" in Fig. 3. IBM sells directly to customers (about 1,000 global customers) through its customer segment regional matrix organization. It sells indirectly to others through partners who are independent software vendors (ISVs), value-added resellers (VARs), and so on. With these additions, IBM became the world's most complex organization. One could reasonably ask, "How in the world does IBM get anything done?" The answer is through a company-wide infrastructure that is massively horizontal and reconfigurable. It consists of a stable set of common global business processes, a reconfigurable set of teams that

are organized around the ever-changing portfolio of opportunities, and a reconfigurable set of decision forums for resolving conflicts and setting priorities. In the following sections, I will describe in more detail exactly how IBM manages this vast and complex organization.

Global business processes. One of the first things that CEO Gerstner did after changing the organization structure was to implement thirteen global business processes to hold the structure together. All managers in IBM went through a one-week training program on the use of these horizontal processes. Multi-dimensional organizations, in general, and reconfigurable ones, in particular, are process intense. They have all the processes that one would find in an M-form organization, plus several others. They have a business unit planning process, like an M-form, plus a segment and a regional planning process. They also have a reconciliation process which works through overlapping memberships and collaboration. A reconfigurable decision-making body resolves any remaining conflicts.

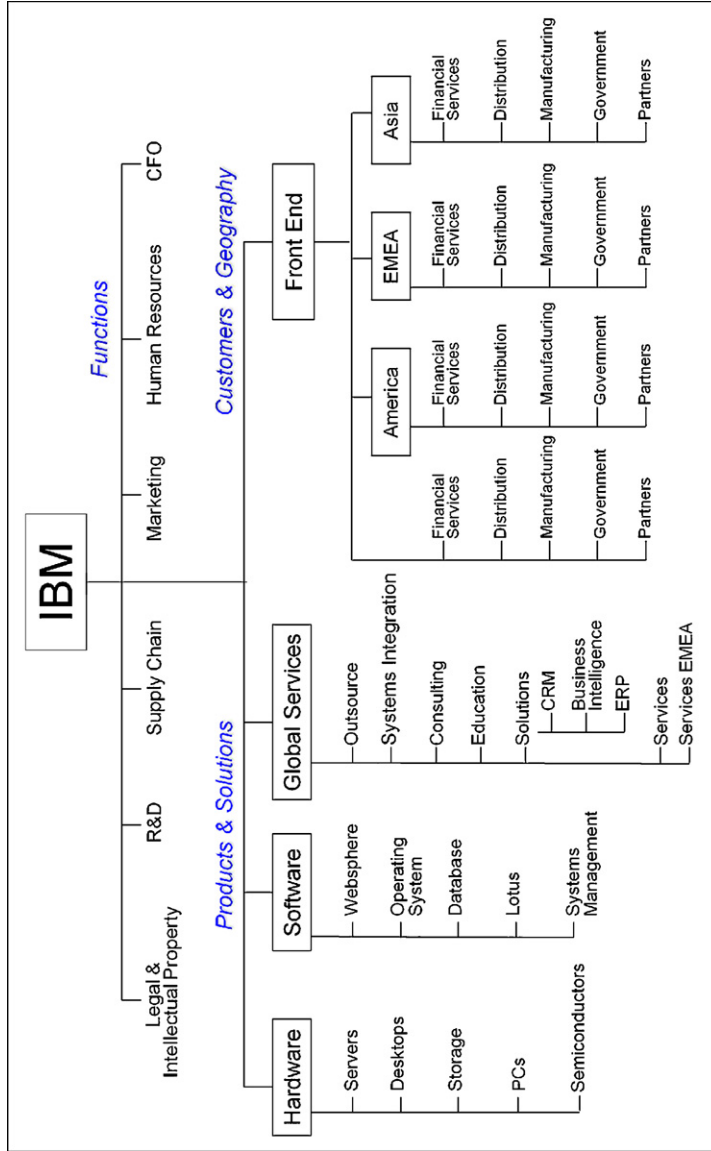
Solutions providers are also process intense. They have a new product development process, plus a new solutions development process and a portfolio management process. The portfolio process is needed because all of the products, hardware, software, and services, must work together in an integrated solution. So when IBM launches a new mainframe it must also launch new compatible software and services products to complete the solution. IBM competes not just on a product-by-product basis but also on an integrated portfolio basis.

A key horizontal process is the customer relationship management (CRM) process. It is into this process that all customer plans, priorities, and opportunities are entered. Each opportunity must be acknowledged and a response entered from all product lines within 24 hours. The customer account manager is the opportunity owner and coordinates across the businesses through the account team made up of salespeople from all of the businesses. For large opportunities like solutions, the opportunity owner may move from the account manager to the regional or even the global segment manager. So the size of the opportunity is matched with the authority of the process owner.

The other essential business process is the project management (PM) process. Almost all work in a reconfigurable organization is performed as a project. A common global project management system is essential, as people from around the world move from one project to another. The other essential ingredient is project management talent. Every team member must understand how projects work and how to act as a team member and leader.

Thus, a key means of coordination across IBM's multi-dimensional organization is a large set of robust

FIGURE 3 IBM'S MULTI-DIMENSIONAL STRUCTURE



horizontal business processes. These processes are global and represent a stable component in the reconfigurable organization.

Assembly and disassembly of teams. The reconfigurable portion of the structure is the formation and reformation of teams to address opportunities. Opportunities are of three main types. They can be new product development opportunities coming from the businesses. They can be new emerging business opportunities (EBOs) that are managed out of the strategy group. Or they can be customer opportunities that can originate with customer account teams in the segments or from emerging market customers. Here I will focus on the segment account teams and how they work.

Segments are broken into industries, and then into customer accounts. The large accounts such as P&G and BMW may do \$1 billion of business per year with IBM. These customers have an account manager assigned to them who is a general manager of a billion dollar business. As mentioned above, the account managers have account teams of salespeople from all of the businesses whose products the customer buys. There are also software and support engineers who are assigned to the account. There is a project management unit to manage all the projects that are taking place at the account. The salespeople are like the P&G salespeople on the Wal-Mart team. They report to the account team and to their business units. The organization of the account teams is the IBM structure in microcosm.

The segment business plans are built from the account up. The normal orders for products are processed automatically through the business process. But when the customer becomes interested in a big solution, it is then that the company configures large teams to first win the business and then to implement the project when it is won. The solution is usually anticipated and put into the customer and segment business plans. From there, the team members see that it is also in all of the business unit plans. The account team members and the project manager line up and educate their counterparts in the businesses about the customer opportunity. These counterparts are the ones that will join a capture team when the customer issues a formal Request For Proposal (RFP). They will return to their business unit when the proposal is completed. If the proposal is accepted, many of the same people will rejoin the customer account team to form an implementation team that will deliver the solution to the customer. When their work is completed, these people will return to their business units. In this manner, there is a continual assembly and disassembly of solution teams around customer opportunities.

There is also a continual setting of priorities in gathering the types and amounts of talent to staff the

solution teams. There are three levels of escalation to attain the proper staffing. First, the team members and the project manager line up talent in the business units from which the account team members come. They are guided by company priorities when conflicts arise. Customers are given priorities by the segments. Top priority customers are the most profitable, have the most potential, or can provide the most information for IBM's learning. There are also solution priorities. If a solution is a "first of a kind" (FOAK), it is staffed with R&D people who will help design the solution so that it can be replicated at other customer sites. Many talent allocations can be achieved at this level.

The next level of resolution when two or more account teams need the same resources is the regional or global segment team. If the conflict is within a segment, it can be resolved at the segment level. Those conflicts that are cross-segment go to the Regional Operating Committees. These committees meet once or twice per week to balance opportunities with resources within a region. Failing resolution at the regional level, there is the option of going to the third level, which is the company Operating Committee.

Reconfigurable decision forums. Opportunities at IBM, as mentioned above, can come from the existing businesses, future businesses, segment customers, and emerging market customers. These opportunities easily exceed the resources even of companies as large and capable as IBM. As a result, priority choices are a challenge to the leadership. When the opportunity set is constantly changing, the priority decision-making process needs to be fluid as well. Previously at IBM, these decisions went to the Management Committee, consisting of a few of the top executives. When Samuel Palmisano became CEO, he disbanded the Management Committee and put in its place three decision forums. The Technical Committee, chaired by the Chief Technical Officer, managed the new product programs and product portfolio. The Chief Strategy Officer chaired the Strategy Committee. And, finally, the CFO chaired the Operations Committee.

The unique feature of these bodies is their membership. On each decision forum there is a core team of seven or eight top managers. The core team is like the old Management Committee, as they are members of all three teams. But the rest of the members come from different levels and parts of the organization. Each committee consists of about 25 members. The other members are not core team members, and the composition of this group changes regularly. Different views and knowledge can be brought to bear on the issues. The body is reconfigurable and can match the changing set of issues facing IBM. Since most talent is mobile within a region, the Regional Operating Committees are responsible for the staffing of solution teams.

Thus, IBM has created an organization that can reconfigure itself to address a changing set of global opportunities. It consists of a stable structure (shown in Fig. 3) and a stable set of horizontal processes. The organization reconfigures itself by constantly assembling and disassembling large teams to pursue opportunities. And in order to resolve the many priority conflicts, there is a set of decision forums. These forums have reconfigurable memberships to address the varying set of issues on the evolving agendas.

Recent Changes in IBM's Structure

Several changes have been made to the IBM organization in recent years in preparation for the Smart Planet strategy. These changes have moved IBM from a front-back structure to a functional structure. The front end (the sales and distribution functions) is roughly the same region–customer segment matrix as before. However, the regions are North America, Western Europe, Japan, and the new Emerging Markets region. Emerging Markets, which is only about 10% of IBM's revenue at the moment, will now get full attention from the regional leaders and a focus on infrastructure projects. The biggest changes have been made to the Global Services Group and the Hardware Group. Global Services has split into three units as it has grown. The business units are divided between Global Technology Services (outsourcing of data centers, repair and installation, and technical consulting) and Global Business Services (business process outsourcing and business consulting). All of the people who deliver the services have been consolidated into a Services Delivery function. IBM thinks of this function as a supply chain for services – it is the function that innovates and automates the delivery of services. In addition, it can allocate service resources to the ever-changing portfolio of Smart Planet opportunities. Most of the Services Delivery function is structured like a consulting company with no permanent positions.

A similar change was made to the Hardware Group of business units. The manufacturing and engineering design resources were consolidated into a functional structure. The talent was then shared across the server, mainframe, and storage product lines. In addition, IBM has provided its manufacturing and design capabilities to other companies that want to outsource those functions. So rather than locking up resources in business unit silos, IBM has created flexible talent pools in functions that can meet the changing staffing needs of opportunity capture and execution teams.

The return by IBM to a functional structure (U-form) seems strange, given that this is the oldest form of organizing. One long-standing tenet of organization design theory is that the greater the diversity of the portfolio of businesses, the greater should be the decentralization of decision making to the business

units. IBM has a very diverse portfolio consisting of semiconductor components, hardware products, software products, financial services, several other services, and an array of solutions. If these were stand-alone businesses, IBM would be categorized as a conglomerate. But rather than leaving these businesses independent and managing them through a holding company, IBM combines them into large integrated solutions providers. The IBM organization is less strange when one notices that Cisco Systems, with an equally diverse portfolio, has also reintroduced a functional structure. Cisco, like IBM, manages all cross-functional business opportunities through teams called “councils.” So something must be going on. What follows is my hypothesis.

Both of these companies provide digital solutions. The technology functions are therefore active to see that all products use common architecture and work together. All products and services must easily combine into integrated solutions. The strength of a functional organization is that it drives commonality across the company and reduces duplication. The human resources are then gathered into functional pools so that they can be easily assigned to teams, which cover a constantly changing portfolio of opportunities. In this way, IBM reduces the multi-dimensional complexity. The company approximates a two-dimensional structure consisting of functions and opportunities. There is still interdependence among the dimensions, but much of the coordination of interdependent linkages is programmed into the horizontal business processes. Coordination is thus mostly automatic.

Coordination that is not automatic is managed by cross-functional teams. These teams focus on “first of a kind” (FOAK) activities. FOAKs can be solutions, products, future businesses, channels, processes, customers, or countries. But they are all treated as opportunities, regardless of the dimension that they represent. The teams create the new product or solution and embed it into the business processes. From the processes, it can be reused and continuously improved. In this way, IBM in effect has converted itself back into a two-dimensional and reconfigurable organization. It can reconfigure itself to address opportunities of every dimension. This hypothesis, of course, needs to be refined and tested, but it seems clear that horizontal processes are the solution to potentially overwhelming organizational complexity.

DESIGN IMPLICATIONS

There are both theoretical and managerial implications of the design concepts of multi-dimensional and reconfigurable. Let us look first at the theoretical ones. One of the theoretical issues raised in this paper is, “What is a new form of organization?” The Special

Issue editors in their opening article describe four traditional organizational designs that have emerged over time (U-form, M-form, matrix, and multi-firm network). They focus on forms that emerge *de nouveau* from green field sites. New forms emerge unencumbered by any legacy systems. In contrast, I focus on the large existing companies that continually modify their organizations to capitalize on new opportunities. In this regard, I am following Alfred Chandler's notion that new forms of organizing result from a concatenation or joining together of different organizational forms. P&G's Four Pillars structure is one such example. It is a concatenation of four organizational forms: functional, business unit (product), geographic, and customer. P&G's structure has twelve large management challenges – it must manage four portfolios of dimensions and the two-way, three-way, and four-way interactions among them. In order to succeed with this new organizational form, P&G has developed new business and management processes to hold all of the interdependent dimensions together.

Similarly, IBM is a concatenation of all known organizational forms. Each Smart Planet solution consists of a network of partners. There are more than thirty partners for the Stockholm traffic system. There are also more than thirty for the London system, some of which are the same, and some of which are different. And the new collaborative community of firms design described by the Special Issue editors is largely an IBM organizational innovation.

The IBM example also raises the issue of limits to complexity. Certainly, there must be a limit to the complexity that a human organization can manage. IBM offers an example of how an organization can increase its capacity for coordination by reducing complexity through horizontal processes, some of which are converted into software. In this manner, IBM automates much of the coordination required. Indeed, IBM sees this automation of services as a competitive advantage. It both uses automated services itself and sells them for use by others. Tellingly, IBM is increasing its R&D funding for projects that reduce the labor intensity of services, and it is patenting the most successful results. Thus, IBM is staking its future on automated services that can be downloaded into solutions.

The P&G example elaborates on how to enlarge coordination capacity. P&G, too, has built business and management processes like IBM, but it has also

built a widespread capability of working in teams. People are selected and developed for their teamwork skills, and the company has created a culture that supports the management of complexity through teamwork.

The concepts of multi-dimensional and reconfigurable also have implications for management practice. One management implication follows directly from the theoretical implications. Few managers embrace complexity. Indeed, most try to avoid it. But P&G and IBM have shown that they can create value by adding and managing more complexity in their organizations. These companies have gained competitive advantage with their superior and more effective organizations. Few leaders think of organization as a source of advantage. Yet it fits the key criteria: It is difficult to manage multi-dimensional organizations that create value, and they are difficult to copy. New organizational designs thus deserve a place in the manager's arsenal of competitive weapons.

Those managers who adopt multi-dimensional and reconfigurable thinking will be wise to focus on horizontal processes. While P&G's Four Pillars structure represents an intricate weaving of dimensions into a matrix, it is the business processes and management decision processes that are key. The star of the show for the design of new organizational forms will be process design.

And, finally, the creation of multi-dimensional and reconfigurable organizations is based on the development of organizational capabilities over time. P&G is the best example. It has developed over the decades the ability to work in cross-functional teams. The result is a teamwork culture that is hugely valuable. By contrast, many companies today are trying to pursue strategies that far exceed the capabilities of their organizations. Christopher Bartlett of the Harvard Business School has said that companies "are pursuing third generation strategies using second generation organizations that are staffed with first generation human resources." We need to invest in and develop the capabilities of our people and organizations before we can master today's complex global economy.



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